

Unit 4

Day 5

Finding a Specific Term

## Summary of Binomial Expansion of $(x + y)^n$ Patterns:

1. There are  $n + 1$  terms in the expansion.
2. The first term is  $x^n$ , and the last term is  $y^n$ .
3. In each succeeding term, the exponent on  $x$  decreases by 1, and the exponent of  $y$  increases by 1.
4. The sum of the exponents on  $x$  and  $y$  in any term is  $n$ .
5. The coefficient of the term with  $x^r y^{n-r}$  or  $x^{n-r} y^r$  is  $\binom{n}{r}$ .

For reference:

5)

$$(x-2y)^6$$

$$\begin{aligned} & \binom{6}{0}x^6 + \binom{6}{1}x^5(-2y) + \binom{6}{2}x^4(-2y)^2 + \binom{6}{3}x^3(-2y)^3 + \binom{6}{4}x^2(-2y)^4 + \\ & \quad \binom{6}{5}x(-2y)^5 + (-2y)^6 \\ & x^6 - 12x^5y + 60x^4y^2 - 160x^3y^3 + 240x^2y^4 - 192xy^5 \\ & \quad + 64y^6 \end{aligned}$$

Finding the  $k^{\text{th}}$  term of  $(x+y)^n$ .

formula:  $\binom{n}{r} x^{n-r} y^r$   $r = k - 1$

1) Find the third term of  $(x^4 + 4y^2)^8$

Substitute:  $\binom{8}{2} (x^4)^6 (4y^2)^2$

Evaluate:  $448 x^{24} y^4$

$$r = 3 - 1 = 2$$
$$n =$$

1) Find the 6th term of  $(x - 2y)^{12}$

$$r = 6 - 1 = 5$$

Substitute:  $\binom{12}{5} (x)^7 (-2y)^5$

$$n =$$

Evaluate:  $-25,344 x^7 y^5$

Homework: U4 D5